the curve. Whilst this result is doubtless largely due to complications with bowel complaints, it is, as an examination of the statistics shows, in no small degree caused by the direct influence of the great summer heat of New York on the nervous centres. This is impressively shown by the mortality curve for the whole of the nervous diseases (Fig. 25), which is even more pronounced in this particular than the curve for convulsions alone (Fig. 24). Keeping this fact in view, the peaks showing an increased fatality in London from cephalitis (Fig. 18) and suicides (Fig. 19) during July and August acquire, in the eyes of the physician, a more impressive significance.

The curve for the whole mortality (Fig. 4, NATURE, vol. xxiv. p. 144) shows September and October to be two of the healthiest months of the year. The three curves, scarlet fever (Fig. 26), typhoid (Fig. 27), and diphtheria (Fig. 28), are the most striking exceptions to this, these curves all indicating either a large increase in the death-rate or a high mortality during these months. While closely related to each other, each of these three diseases has a distinct individuality of its own as regards the times of occurrence of the annual maxima and minima, and the varying amplitudes of their range from the mean line. It is a singular circumstance that diphtheria shows closer relations in its death-rate with typhoid than with scarlet fever.

Several other diseases suggest close alliances with each other through their seasonal death rates. Thus the curve for mortification is substantially that of nervous diseases, and the curves for erysipelas and puerperal fever are in all essential respects the same, a fact of singular suggestiveness to the family practitioner. The curve for old age is exactly parallel to that of paralysis, the old man's disease. The curves for skin diseases, rheumatism, dropsy, pericarditis, Bright's disease, and kidney disease exhibit most striking, and in many cases the closest alliances with each other. Lastly, while bowel complaints attain their greatest mortality when the temperature is highest, diseases of the respiratory organs when it is lowest, nervous diseases during the dry weather of spring and early summer, and

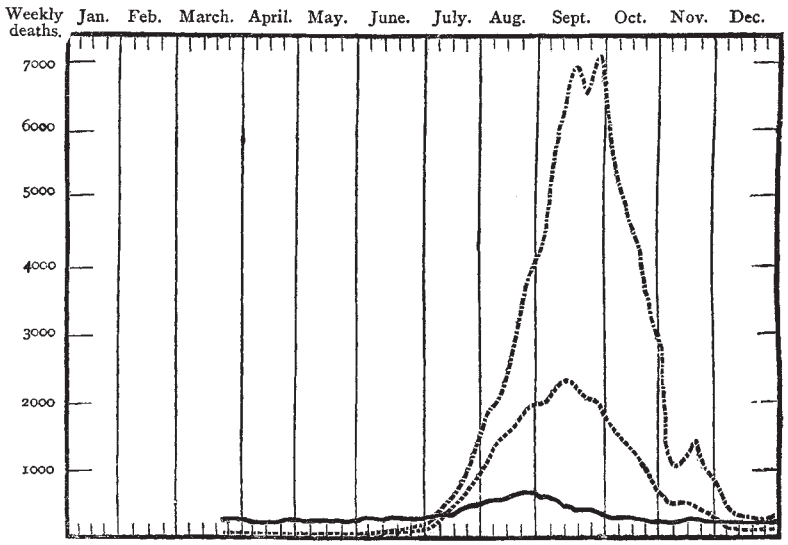

FIG. 29.—The Great Plague of London.

skin diseases and certain fevers during the raw weather of autumn and early winter, such diseases as ileus, that are quite removed from weather influences, exhibit curves which show no obedience whatever to season, but only a succession of sharp, irregular serratures resembling the teeth of a saw.

Atrophy and debility are most fatal to the very young in summer, but to the aged in winter; in the former case the complication being with bowel complaints, and in the latter with diseases of the respiratory organs. The annals of influenza show that a special character is given to this epidemic according to the season of the year in which it occurs. Thus when it occurs in spring the head and nervous system are most affected, but the bowels when the epidemic prevails in summer and autumn.

Fig. 29 shows by the doubly-dotted line, or highest curve, the weekly mortality of London during the Great Plague of 1665, the lower dotted curve the mean weekly mortality of the last six plagues, and the solid curve the mean weekly mortality from all other diseases during the continuance of the last six plagues. The manner in which the plague, as a death-producer, obeyed the weather is striking, and full of interest. It did so exactly in the way in which we have seen bowel complaints to be influenced by weather. The curve of mortality for the plague bears no resemblance whatever to that for typhus, or indeed any other disease except bowel complaints. The fact that the progress of deaths from plague in relation to weather resembles so closely the corresponding progress of deaths from bowel complaints raises the question whether there may not be a closer alliance between them than has been suspected. If we are correct in regarding such a question as a fair outcome of this investigation of the relations of weather and health, it results that such investigations may occasionally point to a seat of morbid processes which have been cloaked by prominent phenomena, apparently of a primary, but in reality of a secondary character.

ALEXANDER BUCHAN

NOTES

THE death of Sir Josiah Mason on the 16th inst., at the advanced age of eighty-six, closes a remarkable career. Born at Kidderminster in humble circumstances, he began life as a street hawker of cakes, and after trial of shoemaking, baking, and a variety of other things in his native place, he went to Birmingham and found employment in the gilt toy trade. In 1824 he set up on his own account as a manufacturer of split-rings by machinery, and he afterwards added the manufacture of stee pens, of which he became really the largest producer, though less known than Gillott and Mitchell, owing to his pens being supplied by Messrs. Perry of London. He shares the credit of perfecting the modern steel pen, the history of which practically

dates from the discovery of the art of splitting by machinery. Sir Josiah Mason also carried on for many years the business of electro-plating, copper-smelting, and india-rubber making, along with the late George Richard Elkington. While he was very much a self-taught man, his very liberal benefactions indicated his sense of the value of good education. Conspicuous among these is the Erdington Orphanage, established at a total outlay of 300,000*l.*; and the munificent gift to Birmingham of a Science College (the building of which cost 60,000*l.*, while the total value of the endowment is probably little short of a quarter of a million) is fresh in public memory.

OUR readers will learn with profound sorrow the loss which biological science has sustained in the death, at the comparatively early age of fifty-one, of one of its most brilliant and gifted cultivators, Prof. Rolleston of Oxford. He had spent the greater part of the winter in Southern Europe, his medical advisers having hoped that a warmer climate and rest from his incessant labours might have averted the malady with which he was threatened. All precautions however proved unavailing. He returned to England about a fortnight ago in a sinking state, and died at his home on Thursday, the 16th inst. We propose to give a sketch of Dr. Rolleston's scientific career in our next number. Immediately after the funeral a meeting of Prof. Rolleston's old pupils was held in the Museum, with the object of perpetuating his name by some suitable memorial. A committee was formed, with power to add to its number; the following gentlemen being elected honorary secretaries:—Dr. C. Mansell-Moullin, 17, George Street, Hanover Square, W., and Dr. Theodore Acland, St. Thomas's Hospital, S.E., London; Mr. E. B. Poulton, M.A., Wykeham House; and Mr. A. P. Thomas, M.A., Anatomical Department Museum, Oxford.

THE Council of Owens College, at their meeting on Friday, June 17, elected Dr. Arthur Schuster, F.R.S., to the Professorship of Applied Mathematics in Owens College. Dr. Schuster was a distinguished student of Owens College in 1870–71; he then proceeded to Germany, studying mathematics and physics under Kirchhoff, Weber, and Helmholtz. On his return he first occupied the position of Demonstrator in Physics at Owens College, lecturing on the Mathematical Theory of Electricity. Afterwards he continued his studies at Cambridge under Maxwell and Rayleigh, publishing several papers on the higher branches of physics. In 1874-75 he was intrusted with the conduct of the Government expedition to observe the total eclipse in Siam, the results of his observations being printed in the *Philosophical Transactions* for 1878. In 1878 he undertook a similar expedition to Colorado, and in the following year he was elected a Fellow of the Royal Society.

THE Davis series of lectures upon zoological subjects will be given in the lecture-room in the Society's Gardens, in the Regent's Park, on Thursdays at 5 p.m., commencing June 16, as follows:—June 16—Whales, by Prof. Flower, LL.D., F.R.S.; June 23—Dolphins, by Prof. Flower, LL.D., F.R.S.; June 30—Extinct British Quadrupeds, by J. E. Harting; July 7—The Limbs of Birds, Prof. W. K. Parker, F.R.S.; July 14—Birds, Ancient and Modern, by W. A. Forbes; July 21—Zoological Gardens, by P. L. Sclater, F.R.S.; July 28—Chameleons, by Prof. Mivart, F.R.S. These lectures will be free to Fellows of the Society and their friends, and to other visitors to the Gardens.

AMONG other features of the forthcoming meeting at York, the noble Guildhall is placed at the Association's use as reception room. The theatre of the Museum of the Yorkshire Philosophical Society has been granted for the Geological Section. The beautiful grounds, containing the ruins of St. Mary's Abbey, &c., will be open to members and associates. The Yorkshire Fine Arts Institution will also be open, and the great hall will be used for some of the evening meetings. The Minster will be thrown open for inspection. Excursions are being organised to several places of interest, including Scarborough (where the Spa Company give free admissions), Whitby, Castle Howard, and the works of Messrs. Bolckow, Vaughan, and Co., at Middlesborough.

THERE has been recently some talk of establishing at Athens or Smyrna an American Institute for the training of Archæologists, and as a permanent committee for archæological research and correspondence. Two institutes with like aims are at present in existence, viz. the German Institut für archäologische Correspondenz, having its seat in Rome, with a branch in Athens, and the École Française d'Athènes, which has a branch in Rome. Mr. Thomas Davidson describes the work of these in a recent issue of the *Nation*, and advocates Smyrna as the place for the American Institute, as offering a more promising field of research than Athens, while there would be a better prospect of getting any antiquities discovered for museums. The cost of such an institution is estimated at 5000 dollars to begin with, for a library and necessary apparatus, and about 6000 dollars a year afterwards.

THE fourth and fifth numbers of *Naturen* for 1881 contain interesting summaries, by Dr. Hercules Tornö, of the results obtained by him, during the Norwegian Arctic Expedition, of the depths of the Arctic seas; the amount of salt contained in the water at various depths and at different distances from land; and the variations observable in the relative quantities of the different constituents of the air contained in sea-water. In regard to the latter point, it may be observed that the mean amount of oxygen present in the air was found to diminish with increasing depth below the surface of the water from 35·3 at the surface, to 32·8 between 1000 and 1400 fathoms; while the relative quantity of the nitrogen present rose with the increased depth from 13·1 at the surface to 14 between 600 and 1000 fathoms. Carbonic acid was found both in a gaseous and basic form.

WE notice a very interesting lecture which has been given at St. Petersburg on the use of the heliograph during the Trans-Caspian war. The heliograph used in the Russian army is that of Mans, and the alphabet is the usual one, that of Morse. The smaller system, which is employed in cavalry, transmits signals to a distance of seventeen miles, and the larger, employed in forts, has a double power. All independent parts of the army, on their march to Akhal-Tepe, had their "heliograph-drafts," and owing to the bright sky of the steppe, and to the level country, the heliograph was continuously used for establishing communication between different parts and small detachments of the army. The heliograph was at work during all the battles, and experiments were made as to the use of it during night, by means of lunar light, as well as with special lamps. The latter, however, being fed with turpentine, which evaporates very soon during the hot days of the summer, did not render great service. It was observed also that the sight of those who receive the heliogram gets very soon fatigued, which occasions error. But altogether the heliograph has rendered very great services during this campaign.

THE French Minister of Postal Telegraphy recently sent to the several telegraphic offices forms for recording all the observations connected with thunderstorms. The forms have been drawn up by M. Mascart, the head of the Meteorological Office, and printed at its expense.

A REPORT has been presented to the Paris Municipal Council on the state of telephonic exchanges in Paris, and the propriety of putting a tax on them for the use of sewers in which the wires are located. The number of telephonic halls will be increased, and six of them will be established shortly, which will bring

their number to ten. At present the number of persons renting wires is a little more than 1000, and the average number of messages a little more than five a day for each.

M. MAREY has asked the Paris Municipal Council for the grant of a space of 1200 metres in the Park of the Champ de Mars for establishing a zoological station; but such a large space could not be afforded without inconvenience to foot-passengers, so he has accepted the grant of a space which was tendered to him at Passy, in the Park of Princes.

THE Congrès archéologique of France holds its forty-eighth session at Vannes (Morbihan) on June 28. Among other subjects to be discussed are the megalithic monuments of the Gulf of Morbihan, the chronology of sepultures, influence of soil on the distribution of megalithic monuments, bronze objects and other remains found in tombs of Brittany, Gallic and Roman coins, ante-Roman remains in Brittany.

TWENTY shocks of earthquake were reported from Szt. Ivan Zelina and Blazedotoc (Hungary) between May 20 and June 7. Some rather severe shocks also occurred on June 11 and 12, direction north-east to south-west.

THE Caucasian Museum at Tiflis is fast approaching completion under the active and energetic direction of Dr. Radde. The visitors from Western Europe, who are expected at the Archæological Congress, will already find a tolerably numerous collection of natural history objects and archæological specimens.

THE discoveries of remains of palæolithic man in Russia continue to be most interesting. Recently M. Shaposhnikoff discovered a great quantity of stone implements in the district of Valdai, where a forest has been cut down and the wind has denudated the sand of the subsoil. The implements belong to four categories: (1) knives and saws similar to those of Moustier, St. Acheul, and Solutre, more perfect than any found previously; (2) the same in miniature, most accurate, and made of the finest kind of flint; they might have been used as ornaments, or for tattooing; (3) figures of animals and men made in flint, and relief pictures of the same, also in flint; (4) ornamental designs on stone. The collection is very rich, especially in miniature implements.

A LITTLE book just published by the Kössling'sche Buchhandlung (Gustav Wolf) of Leipzig is named "Naturwissenschaftlich-mathematisches Vademecum," being an alphabetical and systematic compilation of all modern publications in the domains of natural sciences and mathematics.

AT the meeting of the South-Eastern Railway Company the other day Sir Edward Watkin announced the complete success of the preliminary borings of the Channel Tunnel, and the resolution of his own Company on this side and the French Company on the other to make a further important step. A gallery seven feet in diameter has already been driven from the shaft near Abbots' Cliff for half a mile towards France, and an agreement has been made to push forward a similar headway under the sea for a mile on each side of the Channel. At the present rate of progress this will probably be done within the next six months, and then it is expected that the further nine miles on each side will be undertaken at once. All the conditions seem favourable to the project. The soil is found to be exactly similar at both ends. It is, as was expected, grey chalk impervious to water; and there is every reason to anticipate that it will be found to stretch in an unbroken bed across the Channel. Last week the machinery excavated sixty-seven yards of lineal distance, equal to about two miles a year. At this rate the two headways might meet under the middle of the Channel in about five years; and probably a nearly equal period might be occupied in enlarging this mere seven-feet burrow to a capacious railway tunnel.

IT is proposed in Edinburgh to make a three months' trial of lighting Princes Street and the North Bridge as far as the Tron Church with the electric light, on the Brush system.

BIRMINGHAM has resolved to invite the British Association to hold their annual meeting for 1883 in that town.

THE last number of the *Journal de Physique* describes a set of registering electrometers and magnetometers which are being tried at the Collège de France. The magnetic bars and the apparatus generally are very small. The instruments have been invented by M. Mascart, who believes they will give trustworthy results, and will compare favourably with the large magnetometers used in Kew and other places.

THE past winter cold in Norway, between October, 1880, and March, 1881, has exceeded the normal mean by 7° C. The greatest cold yet registered at any of the Norwegian meteorological stations occurred between January 13 and 15. At Karasjok, the lowest temperature was observed on February 4, when the thermometer fell to − 50°·6 C., the lowest ever noted in Norway with trustworthy instruments.

A WORK on the Butterflies of Europe, illustrated and described by Dr. Henry Charles Lang, F.L.S., will shortly be published in about twenty monthly parts. It will give accurate coloured figures of all the species of Rhopalocera found in Europe, showing both the upper and under side where necessary, as well as the differences of sex, if requiring a separate figure; and the most important of the named varieties will, when possible, be also represented. Typical illustrations of larvæ and pupæ will from time to time appear. The figures will be drawn from speci nens in the author's collection. The description of a species will, whenever possible, include a notice of its transformation, habitat, and times of appearance, along with the principal synonyms and necessary references. The arrangement and nomenclature will be mainly those of Dr. Standinger's well-known catalogue. Each part will contain four coloured plates and sixteen pages of letterpress. The cost is very moderate. The publishers are Messrs. Reeve and Co., of Henrietta Street, Covent Garden.

THE additions to the Zoological Society's Gardens during the past week include a Chacma Baboon (*Cynocephalus porcarius*) from South Africa, presented by Mr. Thornburgh-Cropper; four Harvest Mice (*Mus minutus*), British, presented by Mr. Henry Laver; a Banded Grass Finch (*Poëphila cincta*) from Queensland; two Yellow-bellied Liothrix (*Liothrix luteus*) from India, presented by Mrs. Hylton Joliffe; a Red-legged Partridge (*Caccabis rufa*), European, presented by Mr. Arthur Morrell, School Ship *Cornwall;* a Horrid Rattlesnake (*Crotalus horridus*) from Bahia, presented by Dr. A. Stradling, C.M.Z.S.; a Patas Monkey (*Cercopithecus ruber*) from West Africa, a Blue Jay (*Cyanocitta cristata*) from North America, purchased; a Rhesus Monkey (*Macacus erythræus*), a Cape Buffalo (*Bubalus caffer*), born in the Gardens; seven Australian Wild Ducks (*Anas superciliosa*), five Chiloe Widgeons (*Mareca chiloensis*), a Mandarin Duck (*Aix galericulata*), two Geoffroy's Doves (*Peristera geoffroii*), two Turquoisine Parrakeets (*Euphema pulchella*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN

THE SOLAR PARALLAX.—At the sitting of the Paris Academy of Sciences on the 6th inst. M. Tisserand communicated a note received from Mr. Todd of the office of the *American Ephemeris* at Washington, giving the value of the solar parallax deduced from the photographic operations of the American expeditions, as detailed in the "General Discussion of Results," a volume which has just been issued. The number of photographs is 213, distributed over various stations thus :—